

Course Contents:

Atmosphere as a Physical system, Introduction to Atmospheric Models: Simple Radiative model, Greenhouse Effect, Global Warming; Atmospheric Observations: The mean Temperature and Wind Fields, Gravity Waves, Rossby Waves, Ozone. Potential Temperature, Parcel Concepts, The Available Potential Energy, Moisture in the Atmosphere, The Saturated Adiabatic Lapse Rate, The Tephigram; Cloud Formation; Thermodynamics of Chemical Reactions, Chemical Kinetics, Bimolecular Reactions Photo-dissociation, Stratospheric Ozone, Chapman Chemistry, Catalytic Cycles, Transport of Chemicals; the Antarctic Ozone Hole; Aerosol Dynamics: Discrete and continuous aerosol size distributions; Thermodynamics of atmospheric aerosols; Homogeneous and heterogeneous nucleation; Coagulation and coagulation kernels; Condensation/evaporation, saturation vapor pressure corrections; Fluxes to a particle population; Sedimentation and dry deposition; Chemical equilibria; Heterogeneous reactions in aerosol aqueous phase; Aerosol-cloud interactions; Aerosol and Global Climate: Trends in anthropogenic emissions and troposphere composition Solar and terrestrial radiation; Effect of pollutants on Earth's radiation budget; Radiation scattering by aerosols and clouds; Models for global warming and cooling.